CROSSWALK OF PRELIMINARY OBSERVATIONS FROM PADUCAH PHASE I OVERSIGHT INVESTIGATION TO PROPOSED CORRECTIVE ACTIONS

ENVIRONMENTAL PROTECTION

The Paducah site is being cleaned up under an enforceable agreement established with the Commonwealth of Kentucky and the Environmental Protection Agency (EPA) under requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The site is in general compliance with this Federal Facilities Agreement (FFA) for site remediation and has taken compensatory actions to protect the public from offsite radiological and chemical contamination. Examples include hooking up homes in the path of offsite contamination plumes to public water supply, surface water runoff barriers, limited pump and treat systems, and limited posted warnings. The investigation team, however, questioned the rate of progress toward actual cleanup of the legacy hazards at the Paducah site, and the priorities and funding assigned under the cleanup agreement. These legacy hazards are sources of continuing onsite or offsite contamination of surface water and groundwater. Target level funding will take the site cleanup beyond the milestone for completing cleanup.

Observations

- Since the discovery of the contamination of offsite wells in 1988, the two groundwater plumes containing technetium 99 and trichloroethylene (TCE), as well as trace amounts of transuranic materials, continue to propagate at one foot per day and now extend for over two miles.

- Drum Mountain, contaminated scrap piles, burial grounds, and other legacy hazards continue to contribute to the contamination of Big and Little Bayou Creeks via surface water runoff.

- The site air monitoring programs have not assessed potential legacy "fugitive" emissions from scrap piles, contaminated ground, and rooftops of contaminated facilities.

- Over 30,000 drums of low level waste remain stored onsite, many in degrading 55-gallon drums and on open ground versus cement pads. While there is a regular inspection program and some drums have been overpacked, there is a lack of plans and funding for offsite shipments and only limited onsite facilities are available for inside storage.

Corrective Actions

- Execute a study of existing Commonwealth of Kentucky and United States Enrichment Corporation (USEC) site air monitoring systems to confirm that these systems would record any significant Department of Energy (DOE) contribution to the overall site emissions. Also, based on these studies, evaluate the calculations contained in the Bechtel Jacobs Company Annual Report on National Elimination System Hazardous Air Pollutants (NESHAPS).

- Sample the roofs of several shutdown contaminated buildings. This action will be taken to support fugitive emissions calculations. (Safety evaluations are now underway regarding the structural competence of these roofs. Personnel will be tied to safety ropes in some fashion at all times while on these roofs. Only if a substantial level of safety can be demonstrated will sampling be attempted.)

- The Engineering Evaluation and Cost Analysis (EECA) developed under the CERCLA/FFA for the scrap metal piles and Drum Mountain is now under review by the cognizant regulators. Pending

approval, characterization of these materials is scheduled to begin late in the summer of 2000. To promote efficiency, DOE will propose that characterization be followed by immediate disposal of this material. This activity is currently severely constrained by funding.

- Additional sampling and analysis of Paducah off-site areas will be carried out.

RADIATION PROTECTION PROGRAM

Significant improvements were initiated in the Paducah radiological protection program in response to inspection findings and concerns with transuranic material in the early 1990s. At Paducah, current external radiation hazards are low, in comparison to other DOE facilities. Bechtel Jacob Company workers do not appear to be receiving radiation doses that approach current limits. Although legacy contamination has the potential to cause internal radiation doses, bioassay results indicated that internal uptakes of radioactive materials are presently not occurring. A number of specific deficiencies identified during the investigation, however, indicate a need for improvement in the level of discipline, formality and oversight to ensure exposure to legacy radiological hazards is limited to levels that are as low as reasonably achievable.

Observations

The radiation protection program was subject to significant upgrades in the early 1990s and is generally functional, but a lack of discipline, formality, and oversight is creating deficiencies which impact the ability to ensure that worker exposure to legacy radiological hazards is maintained as low as reasonably achievable (ALARA), as required by DOE's radiation protection policy.

- The investigation determined that 25 subcontractor employees working on a project in the UF_6 cylinder yard since May 1999 could be subject to radiological exposure of greater than 100 millirem in 1 year (one-fiftieth of the occupational dose standard) and should wear personal dosimetry (thermo-luminescent dosimeters--TLDs). The contractor stopped work, conducted training, and is issuing TLDs.

- A number of radiologically contaminated areas were identified onsite and offsite on DOE property that were not adequately posted or barriered in accordance with DOE requirements.

- Training on transuranics was last conducted in 1992 and is not yet incorporated into site safety training courses.

- Drums of uncharacterized waste and concentrated Tc-99 have contributed to worker hazards, including Tc-99 personnel contamination from ruptured containers, the sampling of pressurized drums without containment, and instances of lids blowing off.

- There are weaknesses in the controls essential to radiological protection including radiation work permits, procedures and procedure adherence and air monitoring.

Corrective Actions

- Consistent with discussions during the "stand down" on September 9, 1999, DOE will provide employees with updated information on the management of transuranic waste, and information on TLD and air-emission monitoring.

- An independent detailed review of the Bechtel Jacobs Company radiation protection program and its implementation at Paducah will be initiated.

- A dialogue between DOE, the Commonwealth of Kentucky, and EPA Region IV will be initiated regarding the adequacy of site postings of contaminated areas called for in approved CERCLA or RCRA decision documents, or other agreements.

CONTROL OF LEGACY HAZARDS AND PROTECTION OF WORKERS

This investigation did not reveal any immediate threats to the health and safety of workers, but the Paducah legacy hazards from the Cold War continue to constitute a challenge to worker safety and health. The site has accomplished some characterization of the legacy hazards and has increased the use of personnel protective equipment to protect workers.

Observations

While some characterization of hazardous facilities and materials has been accomplished, significant amounts of onsite hazardous legacy materials and waste have not been reduced or mitigated.

- The DOE material storage areas contain significant volumes of uncharacterized scrap equipment and materials returned by USEC, that have been stored since at least 1996, and that may constitute potential hazards to the workers.

- Approximately 30,000 55-gallon drums of waste are stored onsite. Many are stored outside in the elements over open ground. Very little low-level waste has been shipped offsite, and a lack of funding and priority has resulted in extending the planned disposal date from 2006 to 2012.

- Process buildings shutdown for over 20 years contain significant amounts of uncharacterized hazardous materials including uranium in the ventilation ducts, receiver ash, and transuranics contamination. Shutdown buildings have been allowed to deteriorate and are subject to animal infestation, broken windows, and leaking roofs, are not included in the 2010 cleanup schedule, and are increasing in risk and cost to decommission.

- The nearly 37,000 uranium hexafluoride (UF_6) cylinders stored onsite in the open at Paducah constitute a radiological exposure hazard and a potential threat to worker and public health in the event of fire and rupture, but the Defense Nuclear Facilities Safety Board recommendation to upgrade the condition and convert the UF_6 to a more stable form has been impacted by the cancellation of painting 1,400 cylinders due to funding constraints and lack of appropriated funds for a UF_6 conversion facility.

- Fluorine cells were transferred to industry in 1997 and 1998 using uranium release criteria rather than more restrictive transuranic release criteria as committed to in 1990. Sample results indicated that the

cells contained small but detectable quantities of plutonium, americium, and neptunium. Had the more restrictive criteria been applied, the transfer may not have been approved.

Corrective Actions

- A strategy is being developed to address the DOE Material Storage Areas. The initial focus will be to proceed with material characterization and improved storage of containers with uranium-bearing materials.

OVERSIGHT OF ENVIRONMENT, SAFETY AND HEALTH

DOE established a site office in 1989 to provide program direction and day-to-day oversight. However, the level and effectiveness of line management oversight of environment, safety, and health and assurance of compliance with DOE requirements is a matter of concern.

Observations

DOE and contractor management oversight of site activities and environment, safety, and health performance has several weaknesses and needs improvement.

- The DOE Oak Ridge Operations Office has not routinely performed oversight at the Paducah Site unless requested by the site office.

- The DOE Paducah Site Office consists of only 10 personnel who are focused primarily on project management. None of these personnel routinely perform ES&H field oversight and the office is not staffed in key technical areas such as facility representatives and health physics professionals.

- Contractor management has performed only limited management oversight of field activities and ES&H performance and is losing the technical capabilities to do so, including a significant loss of industrial hygienists, safety engineers, and hydrogeologists.

- Despite a shift to an M&I contract and increased reliance on subcontractors, the contractor oversight of subcontractor ES&H performance and adherence to applicable DOE requirements is weak.

- Community outreach efforts and activities that are designed to develop and disseminate information on site operations and on environmental protection could be strengthened.

Corrective Actions

- Bechtel Jacobs Company will develop and present a detailed radiation safety and environmental protection program training module to all Subcontract Safety Advocates. (These are Bechtel Jacobs' personnel who oversee the safety performance of specific subcontractors.)

- The Department of Energy will station two new Facility Representatives at Paducah.